

REMARKS/ARGUMENTS

Claims 1-15 and 17-19 are pending in this application with claims 1, 17, and 19 being the only independent claims. Claim 16 has been canceled without prejudice. New claim 19 has been added, which is supported by original claim 16. Claims 4 and 14 have been amended to remove minor informalities indicated in the Office Action. Additional amendments have been made to the claims to conform to U.S. patent practice without narrowing any of the claims or any claim element contained therein. No new matter has been added.

Reconsideration of the subject application is hereby respectfully requested.

Overview of the Office Action

Claims 4, 14, and 16 have been objected to for containing minor informalities.

Claims 1 and 16 have been rejected under 35 U.S.C. § 112, second paragraph.

Claims 1-3, 5-8, 11-14, and 16-18 have been rejected under 35 U.S.C. § 102(b) as being anticipated by USP 6,185,240 to Jiang or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Jiang in view of JP 57093591 to Sawai.

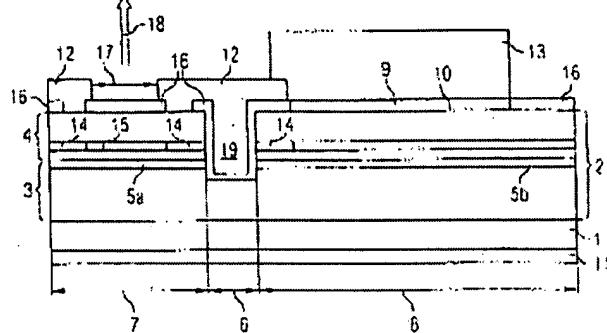
Claims 4, 9, and 10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Jiang in view of USP 6,639,931 to Dowd.

Claim 15 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Jiang in view of USP 5,757,836 to Jiang (Jiang 2).

Summary of the Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed. Fig. 1 is reproduced below for the Examiner's convenient reference.

FIG 1



The specification discloses a light-emitting semiconductor component which contains a sequence of semiconductor layers (2) with an area of p-doped semiconductor layers (4) and an area of n-doped semiconductor layers (3) between which a first pn junction (5a, 5b) is formed (see paragraph [0023], lines 4-7, of the published version of the present application (US 2007/0258500)). The first pn junction (5a, 5b) is subdivided into a light-emitting section (7) and a protective-diode section (8) in a lateral direction by means of an insulating section (6) (see paragraph [0023], lines 7-9). In one example, the first pn junction (5b) in the protective-diode section (8) has a larger area than the first pn junction (5a) in the light-emitting section (7) (see paragraph [0023], lines 9-13).

The light-emitting semiconductor component also has an n-doped layer (9), which is applied to the p-doped area (4) in the area of the protective-diode section (8) (see paragraph [0029], lines 1-3). The n-doped layer (9) and the p-doped area (4) form a second pn junction (10), which acts as a protective diode (see paragraph [0029], lines 3-4). The protective-diode section (8) protects the light-emitting semiconductor component from voltage pulses due to electrostatic discharges (ESD) (see paragraphs [0030]-[0031]).

Patentability of the Claimed Invention

Independent claim 1 is not taught by Jiang

Independent claim 1 recites that "an n-doped semiconductor portion provided in the

protective-diode section and on a side of the area of p-doped semiconductor layers facing away from the first pn junction,” “the n-doped semiconductor portion forms a second pn junction with a first portion of the area of p-doped semiconductor layers in the protective-diode section and is electrically conductively connected to a second portion of the area of p-doped semiconductor layers in the light-emitting section,” and “the first pn junction has a larger area in the protective-diode section than in the light-emitting section.”

Jiang does not teach the above claim features recited in independent claim 1 because:

(i) the stack 109 in Jiang is not “provided in the protective-diode section and on a side of the area of p-doped semiconductor layers facing away from the first pn junction,” as is the “n-doped semiconductor layer” recited in independent claim 1;

(ii) the alleged second pn junction in Jiang is not formed “in the protective-diode section,” as recited in independent claim 1;

(iii) neither one of the conductive layers 123, 125 in Jiang is “the n-doped semiconductor portion ... electrically conductively connected to a second portion of the area of p-doped semiconductor layers in the light-emitting section,” as recited in independent claim 1; and

(iv) the diode 105 and the orifice 122 in Jiang are not part of the first pn junction; therefore the comparison of Jiang’s diode 105 and orifice 122 made in the Office Action is irrelevant to the claim features that “the first pn junction has a larger area in the protective-diode section than in the light-emitting section,” as recited in independent claim 1.

In fact, Jiang is discussed in the background section of the present application, to which the claimed invention seeks to improve.

(i)

Jiang does not teach the “n-doped semiconductor portion” recited in independent claim 1.

The Office Action interprets stack 109 in Jiang as the “n-doped semiconductor portion” recited in independent claim 1. Without admitting or disputing the above interpretation made in the Office Action, applicants submit that no part of Jiang’s stack 109 is both “in the protective-diode section” and “on a side of the area of p-doped semiconductor layers facing away from the first pn junction,” as recited in independent claim 1.

As is illustrated in Fig. 1 of Jiang, the part of stack 109 in the diode section forms and is part of the first pn junction. Therefore, such part of stack 109 is not “provided … on a side of the area of p-doped semiconductor layers facing away from the first pn junction,” as recited in independent claim 1. On the other hand, the part of stack 109 in the second pn junction of Jiang is formed outside the “protection-diode section” and thus does not meet the claim features of “an n-doped semiconductor portion provided in the protective-diode section,” as recited in independent claim 1. No part of the stack 109 can be regarded as “an n-doped semiconductor portion” as recited in independent claim 1 to be both “in the protective-diode section” and “on a side of the area of p-doped semiconductor layers facing away from the first pn junction.”

Therefore, Jiang does not anticipate independent claim 1 for at least the above reasons.

(ii)

Jiang does not teach the “second pn junction” as recited in independent claim 1.

The Office Action interprets Fig. 1 of Jiang to teach a second pn junction (see illustration on page 7 of the Office Action). Without admitting or disputing such interpretation made in the Office Action, applicants submit that such alleged second pn junction of Jiang is not formed “in the protective-diode section,” as explicitly recited in independent claim 1. Rather, the area indicated by the Examiner as the second pn junction is isolated from light-emitting section by trench 137.

On page 5 of the Office Action, Jiang’s diode 105 is interpreted as a protective-diode

section (see, para. f)). As Fig. 1 of Jiang shows, the alleged second pn junction in Jiang is located outside the diode 105 defined by trench 133. Based on the above interpretation by the Office Action, Jiang does not teach a second pn junction formed “in the protective-diode section” and “electrically conductively connected to a second portion of the area of p-doped semiconductor layers in the light-emitting section,” as explicitly recited in independent claim 1. Rather, the area indicated by the Office Action as the second pn junction is isolated from light-emitting section by trench 137.

Therefore, Jiang does not anticipate independent claim 1 for the above additional reasons.

(iii)

Neither one of the conductive layers 123, 125 in Jiang is “the n-doped semiconductor portion,” which “is electrically conductively connected to a second portion of the area of p-doped semiconductor layers in the light-emitting section” as recited in independent claim 1.

With respect to the conductive layer 123, Fig. 1 of Jiang shows that it is located outside the diode section. Therefore, the conductive layer 123 in Jiang is not “the n-doped semiconductor portion” as recited in independent claim 1, which is “in the protective-diode section” as discussed above in Section (i).

With respect to the conductive layer 125, applicants disagree with the Office Action that the conductive layer 125 in Jiang electrically connects the alleged second pn junction to the area of p-doped semiconductor layers in the light-emitting section (see, notation in the illustration on page 7 of the Office Action). As Fig. 1 of Jiang shows, the conductive layer 125 is separated from the conductive layer 123 by a dielectric layer 121 located between the areas 145, 171. Nor is there teaching that such conductive layer 125 is otherwise electrically conductively connected to the light emitting section.

Furthermore, layer 125 is adjacent to conductive portion 169 which is connected to the upper terminal of diode 105. Since layer 125 is connected to the upper terminal of diode 105 it is not “electrically conductively connected to a second portion of the area of p-doped semiconductor areas in the light emitting section,” as recited in independent claim 1.

Therefore, Jiang does not anticipate independent claim 1 for the above additional reasons.

(iv)

Jiang does not teach that “the first pn junction has a larger area in the protective-diode section than the light-emitting section” as recited in independent claim 1.

The Office Action interprets the diode 105 and the orifice 122 in Jiang as the areas of the first pn junction in respectively the protective-diode section and the light-emitting section (see, para. j) on page 6). Applicants disagree.

Neither the diode 105 nor the orifice 122 are a part of the first pn junction in Jiang. Accordingly, the area sizes of the diode 105 and the orifice 122 are irrelevant to the above recited claim features in independent claim 1, which explicitly recites “the first pn junction has a larger area in the protective-diode section than the light-emitting section.”

Moreover, the Office Action refers to widths of the trenches 131, 133 in Jiang when discussing the areas of the diode 105 and the orifice 122. *Id.* Applicants submit that such widths of the trenches 131 and 133 are irrelevant with respect to the areas of the diode 105 and the orifice 122 (which are respectively defined by the trenches 131 and 133), much less those of the first pn junction in the respective protective-diode section and light-emitting section.

In fact, according to the illustration on page 6 of the Office Action, Jiang’s first pn junction diode section appears to be smaller than the first pn junction light emitting section, which is contrary to the above recited claim features in independent claim 1.

Therefore, Jiang does not anticipate independent claim 1 for the above additional reasons.

In view of all the above, independent claim 1 is not taught by Jiang. Withdrawal of the 35 U.S.C. § 102(b) rejection of independent claim 1 is respectfully requested.

Independent claim 1 is not obvious over Jiang and Sawai

Sawai is cited in the Office Action for its alleged teaching of incorporating a second pn junction (i.e., forming an npn junction). Without admitting or disputing such interpretation made in the Office Action, applicants submit that Sawai does not teach, at least, that its npn junction has a protective-diode section and a light-emitting section. Therefore, Sawai does not teach that “the first pn junction has a larger area in the protective-diode section than the light-emitting section,” as is recited in independent claim 1. Nor does Sawai teach that “the n-doped semiconductor portion forms a second pn junction … in the protective-diode section and is electrically conductively connected to a second portion of the area of p-doped semiconductor layers in the light-emitting section,” as is recited in independent claim 1. Accordingly, Sawai does not cure the above mentioned deficiencies of Jiang for at least the above reasons.

In view of the above, independent claim 1 patentably distinguishes over Jiang and Sawai. Withdrawal of the 35 U.S.C. § 103(a) rejection of independent claim 1 is respectfully requested.

Independent claim 17 is allowable

Similar to independent claim 1, independent claim 17 recites that “an n-doped semiconductor provided in the protective-diode section on a side of the area of p-doped semiconductor layers facing away from the first pn junction” and “the n-doped semiconductor portion forms a second pn junction with a first portion of the area of p-doped semiconductor layers in the protective-diode section and is electrically conductively connected to a second portion of the area of p-doped semiconductor layers in the light-emitting section.” Accordingly, independent claim 17 is allowable for the corresponding reasons submitted above in connection with independent claim 1.

In addition, independent claim 17 recites that “the first pn junction in the area of the protective-diode section is short circuited.” Neither Jiang nor Sawai teach these claim features recited in independent claim 17.

The Office Action interprets that Jiang’s conductive portion 169 short circuits the first pn junction (see, para. j) on page 11 of the Office Action). Applicants disagree.

As Fig. 1 of Jiang also shows, a dielectric layer 121 is arranged between the conductive portion 169 and exposed surfaces of the structure of the diode 105. As a result of the dielectric layer 121 in Jiang, the first pn junction in the area of the protective-diode section cannot be short circuited by the conductive portion 169.

Therefore, Jiang does not anticipate independent claim 17 for at least the above reasons.

Sawai is cited in the Office Action for its alleged teaching of a second pn junction. Without admitting or disputing such interpretation made in the Office Action, applicants submit that Sawai does not teach a pn junction in the area of the protective-diode section, which is short circuited. Accordingly, Sawai does not cure the above deficiencies of Jiang for at least the above reasons.

In view of the above, independent claim 17 patentably distinguishes over Jiang, either alone or in combination with Sawai. The rejections of independent claim 17 should be withdrawn.

New Independent Claim 19

New independent claim 19 is added correspond to independent claim 1, but with the n-doped and p-doped areas reversed as is recited in original claim 16. Therefore, for similar reasons presented above, new independent claim 19 patentably distinguishes over the cited art and is thus allowable.

Dependent Claims 2-15 and 18

Claims 4, 9, 10, and 15 depend, directly or indirectly, from allowable independent claim

1. The additional references are cited in the Office Action against the additional features in claims 4, 9, 10, and 15 but do not remedy the deficiencies of Jiang. Therefore, claims 4, 9, 10, and 15 are each allowable for at least the same reasons that independent claim 1 is allowable.

Claims 2-3, 5-8, 11-14, and 18 depend, directly or indirectly, from allowable independent claim 1 or 17 and, thus, each is allowable therewith.

Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited. Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
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